



United States
Department of
Agriculture

Forest
Service

March 2011



Appendix C1

MORRISON RUN PROJECT

BIOLOGICAL ASSESMENT

**USDA Forest Service
Allegheny National Forest
Bradford Ranger District**

Warren and McKean Counties, Pennsylvania
(Mead, Hamilton, and Corydon Townships)

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March 23, 2011

March 31, 2011

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I. INTRODUCTION AND PROPOSED ACTION

The purpose of this Biological Assessment is to determine the potential effects of the activities proposed in the Morrison Run project on federally threatened or endangered species and species that are candidates for listing. This Biological Assessment is prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act (16 U.S.C. 1536 (c)) as amended, and under Forest Service Manual (FSM) 2600 chapter 2670. It also follows the standards established in the Allegheny National Forest (ANF) Land and Resource Management Plan (Forest Plan; USDA-FS 2007a), the ANF Final Environmental Impact Statement (FEIS; USDA-FS 2007b), the ANF Record of Decision (ROD; USDA-FS 2007c), and incorporates the ANF Biological Evaluation (Forest BE; USDA-FS 2007) and the analysis in the Fish and Wildlife Service Concurrence Letter (USDI-FWS 2007). If the scope of the project changes or new information regarding a species changes significantly, this analysis will be updated.

This assessment evaluates the effects of alternatives in order to:

1. Determine potential effects on federally threatened and endangered species and species proposed for listing (FSM 2670.31).
2. Analyze the significance of the adverse effects on the population or its habitat within the area of concern and on the species as a whole if impacts cannot be avoided (FSM 2670.32).

The species considered in this document are the following:

Threatened, Endangered and Candidate Species

Clubshell (*Pleurobema clava*) **E**

Indiana bat (*Myotis sodalis*) **E**

Northeastern bulrush (*Scirpus ancistrochaetus*) **E**

Northern riffleshell (*Epioblasma torulosa rangiana*) **E**

Small whorled pogonia (*Isotria medeoloides*) **T**

Candidate Species

Rabbitsfoot (*Quadrula cylindrical*)

Rayed-bean (*Villosa fabalis*)

Sheepnose (*Plethobasis cyphus*)

Since the completion of the Forest BE (2007), the bald eagle was removed from the Endangered Species List (August 9, 2007) by the United States Fish and Wildlife Service (FWS). The bald eagle will continue to be protected under the Bald Eagle Protection Act and the Migratory Bird Treaty Act but is not considered in this Biological Assessment.

Critical Habitat

There is no designated critical habitat for any federally listed Threatened and Endangered or Candidate Species within the Morrison Run project area or on the ANF (16 U.S.C. 1532 (5) (A)).

The Forest BE (USDA-FS 2007, pp. 47-132), which includes a Biological Assessment, contains the life histories, species distribution and distribution of habitat, habitat suitability and population dynamics, forest habitat, threats to recovery and limiting factors, effects analysis and standards and guidelines for all ANF Threatened, Endangered and Candidate Species. This information is incorporated by reference.

Consultation to Date

The analysis presented in the U.S. Fish and Wildlife Service (FWS) Concurrence Letter (USDI-FWS 2007) for the ANF Forest Plan (USDA-FS 2007a) is not repeated in this Biological Assessment; however, it is incorporated by reference. The Standards and Guidelines for Threatened and Endangered Species established on pages 80-84 of the Forest Plan (USDA-2007a) and in the FWS Concurrence Letter will minimize the potential effects to these species and their habitat.

Current Management Direction

The purpose of the Morrison Run project is to implement the 2007 ANF Forest Plan (USDA-FS 2007a) direction while addressing site-specific needs and opportunities at the project level. The Forest Plan provides programmatic direction for how the ANF is to be managed for sustainable, multiple benefits including healthy forested ecosystems. The Forest Plan separates the ANF into zones or Management Areas (MA) with specific strategies, goals, objectives and associated standards and guidelines for multiple resources.

The management proposed actions are designed to obtain the desired conditions outlined for MA 2.2 Late Structural Linkages (10,562 acres; 55% of the project area), 3.0 Even-aged Management (8,451 acres; 44% of the project area), and 7.1 Developed Recreation Areas (83 acres; <1% of the project area) described in the Forest Plan (USDA-FS 2007a, pp. 109-112, 113-115, and 135-136 respectively). The site-specific purpose and need for the project can be found in Chapter 1 of the Morrison Run Environmental Assessment.

DESCRIPTION OF THE PROPOSED ACTION

WHO The USDA Forest Service, Allegheny National Forest, Bradford Ranger District proposes the Morrison Run project. The District office is located in Bradford, Pennsylvania.

WHERE The project is located in the northeastern portion of the Bradford Ranger District, near Marshburg, PA. The project boundary encompasses 19,705 acres, including 19,098 acres of National Forest Service land and 607 acres of private land. It is roughly defined by the Allegheny Reservoir to the west, north, and south, and private land to the east (Map 1, Project Area and Vicinity). It includes National Forest System lands within Warrants 2376, 3701, 5571, 5572, 5573, 5574, 5575, and 5577 in Hamilton Township and Warrants 3721, 3705, 3714, 3731, 3724, and 4910 in Corydon Township in McKean County and Warrants 574, 591, 2430, 2590, 3721, 3724, and 3725 in Mead Township in Warren County, Pennsylvania.

WHAT This project proposes activities under Alternatives 2 and 3 (Table 1) which will improve forest health and wildlife habitat through vegetation treatments including timber harvest, improve stream quality through reduced sedimentation from reconstructed roads, improve fish and aquatic wildlife habitat through stream treatments, improve access through new road

construction and pit expansion, and improve scenic resources through clearing of vistas. Alternative 1 is the No Action alternative, which is a baseline for the comparison of effects for the proposed treatments in Alternatives 2 and 3.

WHEN The majority of proposed activities are anticipated to be implemented by 2026. For vegetation management, first entry would be completed by 2016. Second entry treatments would occur between 2017 and 2026. This time frame is used to assess direct and indirect effects each species and its habitat. For the cumulative effects analysis, an additional 5 years are added (2031) in order to properly analyze and disclose any residual effects after the last final treatments as regeneration is established. Beyond the 20 years the effects from the majority of treatments proposed will have greatly diminished.

HOW Table 1 summarizes the activities of the proposed alternatives considered in the Morrison Run project. The rationale for choosing the selected vegetation management practices including reforestation (fencing for deer exclusions, prescribed burning, herbicide selection etc.) and herbicide use for non-native invasive plant control and wildlife habitat enhancement can be found in Appendix A of the Forest Plan (USDA-FS 2007a, pp. A-1 to A-46). Other management strategies such as critical timing of harvests, road construction, and site-specific herbicide applications will be employed following the approved standards and guidelines on pages 80-84 of the Forest Plan (USDA-FS 2007a).

Table 1. Proposed Activities by Alternative.

Proposed Activities	Alternative 2	Alternative 3
<i>Non-Native Invasive Plants (NNIP)</i> <i>acres</i>		
NNIP Treatment	442	442
<i>Recreation</i> <i>miles</i>		
Scenic Vista Clearing	10	10
<i>Riparian and Aquatic</i> <i>miles</i>		
Aquatic Habitat Treatment	4.1	4.1
<i>Transportation</i>		
- <i>Roads</i> <i>miles</i>		
New Construction	0.7	0.0
Reconstruction, add to National Forest System	10.2	8.0
Decommission National Forest System and Non-System	1.0	1.0
- <i>Stone Pits</i> <i>number/estimated acres per pit</i>		
Expand Existing Pits	6/2	6/2
Rehabilitate Existing Pits	3/3	3/3
<i>Vegetation Management</i>		
- <i>Regeneration Harvests</i> <i>acres</i>		
Shelterwood Seed Cut/Shelterwood Removal Cut	1,280	1,001
Shelterwood Removal Cut	47	47
Two-Age Final Harvest	8	8
- <i>Intermediate Harvests</i> <i>acres</i>		
Commercial Thinning	64	64
- <i>Timber Stand Improvements</i> <i>acres</i>		

Table 1. Proposed Activities by Alternative.

Proposed Activities	Alternative 2	Alternative 3
Non-Commercial White Pine Release	43	43
Aspen Clearcut	4	4
Non-Commercial Eastern Hemlock Release	14	14
Non-Commercial Release	327	327
Reforestation	45	45
<i>- Activities to Enhance Late Structural Habitat Conditions</i> <i>acres</i>		
Accelerate Mature Forest Conditions	111	111
Oak Release	38	38
<i>- Cultural Treatments</i> <i>acres</i>		
Site Preparation ¹	1,397	1,117
Herbicide ²	1,402	1,122
Release	1,770	1,490
Fence	415	252
Fertilize	649	568
Plant	451	349
Prescribed Burn	366	329
Mechanical Scarification	60	60
<i>Wildlife Habitat Improvements</i> <i>acres (units)</i>		
Herbicide Application in Wildlife Openings	23	23
Construct Vernal Pools	8 (pools)	8 (pools)
Prescribed Burn for Warm Season Grasses	4	4
Create Basking Areas	2	2

¹ Includes acres not associated with overstory treatments.

² Herbicide acres are a maximum and likely to be reduced based on ground conditions.

II. EFFECTS OF THE PROPOSED ACTION

Species Accounts and Habitat Status

Table 2 summarizes the status of Federally Threatened, Endangered or Candidate species in the project area. Of the five threatened and endangered species on the ANF, three have suitable habitat in the project area but none have been documented. Detailed information on the wildlife and plant survey strategy for this project can be found in the Wildlife Report, located in the Morrison Run Project EA project file (Bradford District Office).

Table 2. Federally Threatened and Endangered Species on the ANF

Species	Species Status	Distribution Relative to the Project
Mammals	Endangered	Suitable habitat but presence not

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Indiana bat (<i>Myotis sodalis</i>)		documented in the project area.
Plants		
Small whorled pogonia (<i>Isotria medeoloides</i>)	Threatened	Suitable habitat but presence not documented in the project area.
Northeastern bulrush (<i>Scirpus ancistrochaetus</i>)	Endangered	
Mollusks		
Clubshell mussel (<i>Pleurobema clava</i>)	Endangered	No suitable habitat in the project area.
Northern riffleshell mussel (<i>Epioblasma torulosa rangiana</i>)	Endangered	
Rayed-bean (<i>Villosa fabalis</i>)	Candidate	
Sheepnose (<i>Plethobasis cyphus</i>)	Candidate	
Rabbitsfoot (<i>Quadrula cylindrica</i>)	Candidate	

Effects Analysis Definitions, Boundaries and Rationale

Direct effects are caused by the proposed activities and occur at the same time and place as the triggering action.

Indirect effects are caused by the proposed activities, but they occur at a later time or distance from the triggering action.

Cumulative effects (CE) are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or entity undertakes such other actions (40 CFR 1508.7). An analysis of Cumulative Effects for this project includes identifying and evaluating the effects of Forest Service reasonably foreseeable future activities (Table 3), actions on private land, and private oil and gas development on NFS land.

Table 3. Direct and Cumulative Effects Analysis Boundaries and Rationale

Analysis Area	Time	Space
Direct Effects Boundary	<p>Time Frame: 2012-2026</p> <p>Rationale: The majority of harvesting activities will be completed prior to 2026. This will allow the direct effects from the first entry and second entry timber harvests to be assessed.</p>	<p>Wildlife Boundary: The project area boundary (19,705 acres; 607 acres are private).</p> <p>Rationale: The project area boundary encompasses all proposed actions and allows for the assessment of direct effects from the proposed actions on changes in habitat across the landscape. The northern limit is a natural border created by the watershed boundary and the eastern limit occurs where Federal land meets private land.</p> <p>Sensitive Plants Boundary: Areas with proposed activities.</p> <p>Rationale: The direct effects of management activities on TES plants and their habitat is</p>

		limited to the sites of the proposed activities which lie within the project area boundary.
Indirect Effects Boundary	<p>Time Frame: 2012-2026</p> <p>Rationale: The majority of harvesting activities will be completed prior to 2026. This will allow the indirect effects from the first entry and second entry timber harvests to be assessed.</p>	<p>Wildlife Boundary: The project area boundary.</p> <p>Rationale: The project area boundary encompasses all proposed actions and allows for the assessment of direct effects from the proposed actions on changes in habitat across the landscape. The northern limit is a natural border created by the watershed boundary and the eastern limit occurs where Federal land ends and private land begins (i.e. there are no Federally proposed actions within the private lands). The project area represents a large area for assessing the indirect effects from the proposed activities.</p> <p>Sensitive Plants Boundary: The project area boundary.</p> <p>Rationale: The indirect effects of management activities on sensitive plants is limited to the sites and adjacent areas (defined in the analysis) of the proposed activities which lie within the project area boundary.</p>
Cumulative Effects Boundary	<p>Time Frame: 2012-2031</p> <p>Rationale: This timeframe allows for completion of proposed and remaining approved and reasonably foreseeable Forest Service activities and foreseeable non-forest service activities such as private oil and gas development, vegetation management on private lands, or residential development.</p> <p>The majority of harvesting activities will be completed prior to 2026. An additional 5 years are added to this in order to properly analyze and disclose any residual effects of these treatments</p>	<p>Wildlife Boundary (29,121 acres; 7,557 acres are private) - Based on the following watershed units:</p> <ol style="list-style-type: none"> 1) All of Chappel Fork subwatershed. 2) Kinzua Cr. (lower) subwatershed clipped to the Allegheny Reservoir. 3) Reservoir (lower) subwatershed clipped to the Allegheny Reservoir on the north and west sides. <p>Rationale: Watersheds are biologically relevant boundaries. Across this cumulative effects boundary the vegetation cover types, forest structure and development from non-Forest Service (private) activities are similar. The cumulative effects of the alternatives when added to other past, present and reasonably foreseeable future Forest Service or private actions become diluted beyond this boundary.</p> <p>Sensitive Plants Boundary: The project area boundary.</p>

	as regeneration is established.	Rationale: This boundary encompasses the cumulative effects of management activities and private activities on TES plants. Expanding the boundary to private land would not be beneficial because information is not available and could dilute any effects to TES plant and their habitat.
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The direct/indirect and cumulative effects will be analyzed using four time points:

- 1) Current condition (2011)
- 2) Completion of first entry harvests (2017)
- 3) Completion of second entry harvests (2026)
- 4) Five years past the second entry (2031)

Note that the proportion of private lands within the cumulative effects boundary (FS = 21,562 acres; Private = 7,557 acres) is greater than that of the project area boundary (FS = 19,098 acres; Private = 607).

Reasonably Foreseeable Future Forest Service Activities within the Analysis Boundaries

Activities not yet implemented but reasonably foreseeable future under NEPA documents (Wolf Pigeon EA, Prescribed Fire EA) or currently proposed under NEPA (Upper Kinzua Creek EA) are separated out by compartment and stand for the direct effects boundary and summed by treatment type for the cumulative effects boundary in Table 4. These activities do not overlap with Morrison Run proposed activities in space, but they may overlap in time.

Table 4. Reasonably foreseeable future Activities within the Analysis Boundaries

Previously Approved Treatments within the Direct Effects Boundary			
Compartment and Stand	Treatment	Acres	Document
441025	Delayed Removal Cut	10	Wolf Pigeon EA
442039	Delayed Removal Cut	19	Wolf Pigeon EA
443006	Delayed Removal Cut	15	Wolf Pigeon EA
446031	Delayed Removal Cut	10	Prescribed Fire EA
447004	Delayed Removal Cut	18	Prescribed Fire EA
Total		72	
All Reasonably Foreseeable Future Treatments within the Cumulative Effects Boundary			
Treatment		Total Acres	
Aspen Clear Cut		26	
Delayed Removal Cut		98	
Release		56	
Reforestation		38	

Shelterwood Removal Cut	402
Thin	37
Total	657

Reasonably Foreseeable Future Private Land Timber Harvest within the Analysis Boundaries

Aerial photograph interpretation was used to calculate the acreage of forested private lands (6,705 acres forested vs. 7,556 total acres) within the cumulative effects boundary and then this acreage was split into two age classes: 0-20 years and greater than 20 years (Table 5).

Table 5. Estimated Current Age Class Distribution on Private Land within the Cumulative Effects Area

Age Class	Cumulative Effects Area Acres
0-20 yrs	906
> 20 yrs	5799
Total	6705

This information along with the assumption that forest management activities have been sustained at the same level in the past and will continue at the same level into the future was used to predict future changes in age class. A prediction of 45.3 acres harvested per year on a 148 year cutting cycle was made based on the amount of recent forest management activities. Table 6 shows the changes in age class predicted within the cumulative effects area by 2031. This information is included in cumulative effects analysis age class tables in the rest of the wildlife analysis.

Table 6. Estimated Age Class Distribution on Private Land by 2031

Age Class	Forested Acres
0-20 yrs (early structural forest)	906
21-50 yrs (young forest)	1,359
51-150 yrs (mature forest)	4,440
151-300 yrs (late-structural forest)	0
>300 yrs (old growth forest)	0
Total	6,705

Reasonably Foreseeable Future Oil and Gas Development within the Analysis Boundaries

There are presently an estimated 1,189 active wells within the project area. Table 7 displays the project boundary and cumulative effects boundary estimates of reasonably foreseeable future oil and gas development (OGD). Using an average of 1.3 acres cleared per well which includes well, road, tank batteries, and associated pipelines, the acres of land impacted from well construction is estimated. The details for the assumptions and data used for this analysis can be found in Appendix D, Project Level Effects Analysis for OGD for the Morrison Run Project (Scenario 3).

These activities may overlap with Morrison Run proposed activities in space and time but it is difficult to predict this since oil and gas development is based on predicted future development.

Table 7. Reasonably Foreseeable Oil and Gas Development by 2031

Project Area			
	Existing Condition (2011)	Estimates¹ (full field development)	Future Condition² (full field development)
No. of Wells	1,189 wells	608 wells	1,797 wells
Acres Impacted	1,189 acres	790 acres	1,979 acres
Cumulative Effects Area			
No. of Wells	1,946 wells	878 wells	2,824 wells
Acres Impacted	1,946 acres	1,141 acres	3,087 acres

¹ It is not possible to determine how long it would take full field development to occur.

² Land ownership percentage ratio was calculated to project private development.

SPECIES NOT DOCUMENTED BUT SUITABLE HABITAT IS FOUND WITHIN THE ANALYSIS BOUNDARIES

Indiana Bat (*Myotis sodalis*)

The life history, population trends, threats, and habitat status related to the Indiana bat is located in the ANF Biological Evaluation (Forest BE, pp. 79-105). In summary, between 1998 and 2006, a substantial sampling effort was undertaken on the ANF to further document the presence and distribution of Indiana bats. One male Indiana bat was captured in the southeast portion of the ANF in 1998 (Jones Township, Elk County) and one male was captured on private land adjacent to a northeast portion of the ANF in 2001 (McKean County). These data suggest that male Indiana bats may occasionally be present on the ANF during the summer. The ANF does not have any known Indiana bat swarming habitat or hibernacula and is not located near any large concentrations of Indiana bats. There are only 30 known Indiana bat hibernacula within 250 miles of the ANF. These hibernacula support approximately 5,480 Indiana bats, which equates to about 1.2% of the range-wide Indiana bat population. Research suggests that the ANF is not preferred habitat for reproductive female bats due to the latitude, elevation, and relatively short, cool summers with high precipitation. For these reasons, this BA will address the effects on summer habitat and on any unknown individuals that might be occupying this habitat.

White Nose Syndrome (WNS)

Hibernating bats in the northeastern United States are dying in record numbers and the cause is unknown. This outbreak is named for the white fungus evident on the muzzles and wings of affected bats. It was first documented in eastern New York in the winter of 2006-07. WNS has rapidly spread to multiple sites throughout the northeast. Researchers associate it with a newly identified fungus (*Geomyces sp.*) that thrives in the cold and humid conditions of caves and mines used by bats.

The ANF first considered the best scientific information available with regard to WNS and National Forest management in a July 2008 letter, WNS – Supplemental Information Report which included a Review of New Information for WNS and Bat Populations ANF June 2008 (USDA-FS 2008). In January 2009, WNS was found for the first time in Pennsylvania. In March 2009, a second review was conducted on the most recent scientific information. The analysis and findings of this review are found in the WNS – Report of New Information (USDA-FS 2009).

In the northeast region of the United States (FWS R5), very preliminary estimates indicate Indiana bat populations have declined 30% since 2007 (A. King, unpublished report, R8/9 Bat Focal Group Call Notes, November 2009). In the summer of 2009, as part of a Regional population monitoring effort, ANF biologists collected baseline data on foraging bats using the latest Anabat technology. Echo-location data was collected along four 30-mile routes across the Forest. Although a variety of bats were identified, preliminary data indicates no Indiana bat was recorded. ANF staff continues to work closely with partners, PA Game Commission and FWS to monitor ANF caves for WNS. As of February 2011, no WNS has been confirmed in northwest PA.

The ANF carefully considered impacts of resource management on forest bats in preparing the 2007 Environmental Impact Statement and Forest Plan. Forest projects like the Morrison Run Project EA tier to and incorporate the Forest Plan analysis by reference. In early 2007, bat diseases were not considered a major threat to bats and WNS was unknown. Until causal factors and effective treatments are identified, the ANF will continue to protect cave habitat (cave closure order signed 6/1/2010 on ANF) and manage summer habitats to provide high quality environments that help all bats find adequate food, water, cover and roost sites to survive and successfully reproduce on the Forest.

Project Area Habitat Analysis

As part of Forest Plan (2007) monitoring for the Indiana bat, the ANF must conduct mist net surveys for foraging bats every three years. In the summer of 2010, the ANF conducted surveys on 30 sites distributed across the Forest. These sites targeted suitable bat habitat in a variety of watersheds, management areas, and regions of the Forest. A total of 7 sites were located near the Morrison Run project area in Hamilton, Lafayette and Corydon townships in McKean County. One of these sites was located directly adjacent to the Morrison Run northern boundary near the North Country Scenic Trail and off State Route 59. In total there were 16 net nights with 100 captures total. There were no Indiana bats captured during these surveys (Bat Conservation and Management, Inc., 2010). In conjunction with the mist net surveys the ANF is pursuing a telemetry program to identify maternity roosts and subsequently protect them and enhance the surrounding habitat.

Although much of the forested landscape on the ANF contributes in some way towards maternity landscape/roost habitat and foraging habitat, some acres provide more beneficial conditions than others. The analyses completed in 1998 were used to understand the quality and quantity of habitats found across the ANF. Data was updated based on the most recent vegetation surveys, SPECTRUM analysis, Forest Inventory Analysis, ANF monitoring, and local research regarding the Indiana bat and used in the 2007 Forest BE (p.94). Based on the updated information, the suitability of Indiana bat habitat (roosting habitat- including maternity roosting habitat- and

foraging habitat) based on canopy closure conditions was determined for the ANF (Forest BE, Table 26, p.94). This information for the project area is available in Table 8.

Direct and Indirect Effects of the Proposed Activities on the Indiana Bat

Stand-level Effects

Site-specific direct effects to individual bats are difficult to predict since there are no known Indiana bat roosting sites or maternity colonies. However, there are activities which have the potential to harm individuals. These activities include any kind of timber harvest (including pit expansion and new road construction). Table 8 displays the times of year when Indiana bats are most vulnerable on the ANF.

Table 8. Relative Risk to the Indiana Bat

Calendar Period	Relative Risk on the ANF	Activities in Life History
October 1 – March 31	None	Not on the ANF – near or at hibernacula
April 1 – May 14	None to low	Bats in transit between hibernacula and summer habitat
April 1 – April 15	Low	Migration starts
April 16 – May 14	Moderate	Bats in transit and migration peaks
May 15 – August 15	High	Summer habitat – greatest risk overall to maternity colonies
June 1 – July 31	Very High	Pups born & become volant
August 16 – September 30	Low to Very low	Leaves summer habitat - in transit to hibernacula, swarming, and hibernation

There will be no direct effect to individuals under Alternative 1 because there are no activities proposed under this alternative and because not taking action is not expected to affect Indiana bat habitat. Under Alternatives 2 and 3 there are no seasonal restrictions for the Indiana bat since no roost sites are known and activities could occur at any time of year. However, the removal of known Indiana bat roost trees is not permitted on the ANF and special protection is given if any maternity roosts are discovered (USDA-FS 2007a, pp. 82 & 88). Final harvest units, where the most substantial change in mature forest canopy occurs, are usually scheduled during the winter dormant season to optimize the chances for successful forest regeneration. In general, silvicultural treatments are cut under winter frozen conditions to protect soil conditions or for recreation concerns. It is anticipated that a large portion of the proposed harvests will occur between October and mid-May, when risk is considered to be low to none. In addition, the risk of cutting an occupied tree is considered extremely low, due to the field data collected over the last decade described above. Harvest activities that occur when bats are away from the ANF (October 1 - March 31) will have no direct effect.

Proposed prescribed burning for both Alternatives 2 and 3 are anticipated to occur in the spring of the 2013 (135 acres) and 2016 (113 acres). The exact time of burn will vary somewhat from year to year depending on site-specific weather and fuel conditions. It is possible to burn in the

summer months of June, July, or August, however, it is not likely that this will occur on the ANF due to the fuel types, canopy moisture and desired management objectives. The likelihood of burns in the months of May and September is higher, however, May and September do not typically have the desired conditions required to achieve management objectives (Craig Kostrzewski, pers. comm. March 14, 2011). Since the birth of pups occurs in late June to early July, burning is most likely to occur when they will have the least impact to maternity colonies. As described in the Forest BE (USDA-FS 2007, p. 109), prescribed burning during the summer could result in Indiana bat mortality due to the actual roost tree being incinerated, or death or injury to bats being caused by smoke inhalation. Although this could result in take of Indiana bats, the likelihood of this happening is remote.

Landscape-level Effects

Direct effects to individuals occur at the stand level. Direct effects to Indiana bat habitat occurs at the landscape level and functions as a measure of indirect effects to individual bats in terms of the use and availability of habitat. A landscape perspective of roosting and foraging habitat by alternative across the project area was calculated based on current stand conditions derived from the ANF GIS database. The results are displayed in Table 9.

Table 9. Suitability of Indiana Bat Habitat across the Morrison Run Direct Effects Area

Habitat Description	Habitat Quality	Current (2011)	2017			2026		
			Alt. 1	Alt. 2	Alt. 3	Alt. 1	Alt. 2	Alt. 3
Openings	Less suitable	413 acres, 2.2%	413, 2.2%	413, 2.2%	413, 2.2%	413, 2.2%	413, 2.2%	413, 2.2%
Seedling/sapling habitat, and canopy closure <20%		2 acres, ~0%	2, ~0%	126, 0.7%	126, 0.7%	0, 0%	1,411, 7.4%	1,132, 6%
Mid-late structural forests with canopy closures between 20 and 50%	Suitable roosting and foraging habitat	253 acres, 1.3%	85, 0.4%	67, 0.4%	67, 0.4%	109, 0.6%	91, 0.5%	91, 0.5%
Mid-late structural forests with canopy closures canopy closures >80%		12,109 acres, 63%	14,311, 75%	13,115, 69%	13,305, 70%	16,230, 85%	14,859, 78%	15,107, 80%
Mid-late structural forests with canopy closures between 60 and 80%	Optimal roosting habitat	4,802 acres, 25%	2,839, 15%	3,978, 21%	3,787, 20%	1,575, 8.2%	1,607, 8.4%	1,623, 8.5%

Mid-late structural forests with canopy closures between 50 and 70%	Optimal foraging habitat	1,532 acres, 8%	873, 4.6%	712, 3.7%	712, 3.7%	359, 1.9%	275, 1.4%	275, 1.4%
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The results from Table 9 show that approximately 25% of the project area currently provides canopy closure conditions that are considered optimal for roosting habitat and 8% of the project area is optimal foraging habitat. Suitable habitat exists on approximately 65% of the project area. Based on field observations and GIS data, the distribution of roosting and foraging habitat is widespread across the project area, however, changes in habitat are most apparent in MA 3.0 where the majority (>80%) of treatments will occur.

Optimal roosting habitat for the Indiana bat decreases from the current 25% for all three alternatives. Most notably, the greatest reduction in optimal habitat occurs in Alternative 1 with a drop to 15% in 2017 while the other alternatives remain at about 20%. By 2026 all three alternatives have dropped to around 8% as the overstory is removed or, in the case of Alternative 1 as stands continue to grow and no longer retain the 60-80% canopy closure. Optimal foraging habitat experiences a parallel decline from 8% currently, to about 1.5% across all alternatives by 2026.

Changes in less than suitable habitat after the first entry (2017) are not great since these treatments consist of shelterwood seed cuts where a portion of the mature forest is left in order to provide seed trees which will regenerate as seedlings and saplings. However, stands receiving a final harvest treatment (with the exception of two-age treatments) under Alternatives 2 and 3 would no longer meet the criteria for suitable foraging habitat. This fact is displayed in Table 9 under column 2026 where less than suitable habitat rises from 2.2% in the current condition to 9.6 and 6.2% for alternatives 2 and 3 respectively. Romme et al. (1995) found that Indiana bats prefer to forage in the upper canopy layers of forests where the degree of overstory canopy ranges between 50-70 percent. However, they also found that some foraging takes place over clearings with early structural vegetation, along the forested border of agricultural fields, and along strips of trees extending into more open habitats. Research and on-Forest telemetry data also support these findings and indicate that Indiana bats forage in a variety of forest habitats and landscapes with a mix of canopy closures ranging from 0-100%. This means that it is probable that habitat considered less than suitable still has characteristics that will allow foraging by Indiana bats, but habitat in these conditions is not the most desirable. A benefit of the creation of early structural habitat resulting from final harvests could be to provide more habitat diversity in the predominantly closed canopy forest that characterizes both the ANF and the project area. Further, studies have shown that arthropod species diversity (moths and beetles) varies with forest type and age (Buford et al. 1999, Werner and Raffa 2000) making habitat diversity an important component of bat conservation.

Suitable habitat increases across all three alternatives with Alternative 1 showing an increase to 75 and 85% in 2017 and 2026 respectively, Alternative 2 showing an increase to 69 and 78% in 2017 and 2026 respectively, and Alternative 3 showing an increase to 70 and 80% in 2017 and

2026 respectively. This means that the amount of suitable habitat available will be greatest under Alternative 1, followed by Alternative 3 and then 2.

Based on field observations, snags which provide potential roosts appear to be well distributed across the analysis area. Field surveys found that many standing-dead trees have cavities, crevices or exfoliating bark although there are concentrated areas of potential roost trees where disease (beech bark disease) has impacted stands. Several of the most diseased stands in the project area are recommended for shelterwood sequences in order to address forest health concerns. This will reduce standing snags, however, it is Forest Service standard to retain at least 9 snags with sloughing bark greater than 10 inches DBH per harvest acre (Forest Plan, p. 82) and guideline to retain trees with characteristics of suitable roosts whenever possible while removing hazard trees between October 15 and April 1 (during bat hibernation) whenever possible (Forest Plan, p. 82). There may be benefit from additional exposure to the sun from reserved snags which could improve thermal conditions for roosting. Research findings on thermal qualities of roost sites vary across the range of the Indiana bat. In Michigan (similar climate and latitude as the ANF), Kurta et al. (1993) found a maternity colony where all roost trees were exposed to direct sunlight throughout the day. To the contrary, in Illinois Garner and Gardner (1992) state that roost sites exposed to intense solar radiation during midsummer may exceed potentially lethal temperatures for Indiana bats.

Indiana bat travelling and foraging corridors exist along a variety of openings, utility corridors, pipelines, and Forest Service, State, and lease roads. These areas along with stream corridors (2,502 acres) appear to provide the most suitable foraging conditions in the project. Treatments along stream corridors to improve aquatic habitat includes the felling of trees into the proposed streams. These are not intensive operations and will only occur every few miles. New road construction in Alternative 2 and gravel pit expansion in Alternatives 2 and 3 will result in the conversion of forested habitat to bare areas which will not be suitable foraging and roosting habitat but may provide additional travel corridors.

Overall, optimal roosting habitat for the Indiana bat across the project area is reduced from 25% to about 8% and optimal foraging habitat is reduced from 8% to about 1.5% across all three alternatives. However, suitable roosting and foraging habitat will increase from the current amount to 85.6% under Alternative 1, 78.5% under Alternative 2, and 80.5% under Alternative 3. Less than suitable habitat increases under Alternatives 2 and 3 and remains the same under Alternative 1.

Cumulative Effects of the Proposed Activities on the Indiana Bat

Stand-level Effects

As described under the stand level direct effects, the effects to Indiana bats area caused by the impacts of certain activities such as timber harvest and prescribed fire to individuals. The cumulative effects boundary includes additional activity to the proposed action from reasonably foreseeable future vegetation management activities (Table 4) and projected oil and gas development (Table 7). It also includes projections of the industrial/non-industrial timber management, and the oil and gas development on private lands. Therefore, tree removal is expected under all three alternatives.

There are 657 total acres of reasonably foreseeable future Forest Service activities, 38 acres of which are reforestation treatments which will not have a direct impact on individual bats (Table 4). Potential for effects comes from the other projected 1,141 acres of land that will be impacted by new oil and gas development (Table 7). This total impact would more than double the activity (~1,500 acres management in the Morrison Run project in addition to ~1,800 acres of non-project management) that may potentially impact individual bats compared to the direct effects. Although this could result in take of Indiana bats, the likelihood of this happening is remote due to its limited abundance on the ANF described above.

Landscape-level Effects

A landscape perspective of roosting and foraging habitat by alternative across the cumulative effects area was calculated based on stand conditions derived from the ANF GIS database. It includes vegetation management from FS reasonably foreseeable future activities in addition to those proposed for the Morrison Run project. Table 10 displays changes to the habitat under each alternative. Note that 2031 is not included here because the projections are expected to be minutely different from those for 2026. In addition, Table 7 shows that 1,141 acres of land will be impacted by reasonably foreseeable new oil and gas development (3.9% of the cumulative effects area) and will decrease in suitability for roosting. This change in habitat is not included in Table 10.

Table 10. Suitability of Indiana Bat Habitat across the Morrison Run Cumulative Effects Area.

Habitat Description	Habitat Quality	Current (2011)	2017			2026		
			Alt. 1	Alt. 2	Alt. 3	Alt. 1	Alt. 2	Alt. 3
Openings	Less suitable roosting and foraging	788 acres, 2.7 %	788, 2.7%	788, 2.7%	788, 2.7%	788, 2.7%	788, 2.7%	788, 2.7%
Seedling/sapling habitat, and canopy closure <20%		5 acres, ~0%	714, 2.5%	783, 2.7%	783, 2.7%	711, 2.4%	2,518, 8.6%	2,142, 7.4%
Mid-late structural forests with canopy closures between 20 and 50%	Suitable roosting and foraging habitat	466 acres, 1.6%	94, 0.3%	94, 0.3%	94, 0.3%	123, 0.4%	123, 0.4%	123, 0.4%
Mid-late structural forests with canopy closures canopy closures >80%		17,445 acres, 60%	20,227, 70%	18,604, 64%	18,861, 65%	23,540, 81%	21,689, 75%	22,024, 76%
Mid-late structural forests with canopy	Optimal roosting habitat	8,145 acres, 28%	5,106, 17.2%	5,863, 20%	5,605, 19%	2,320, 8%	2,438, 8.4%	2,458, 8.4%

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closures between 60 and 80%								
Mid-late structural forests with canopy closures between 50 and 70%	Optimal foraging habitat	2,548 acres, 8.8%	1,445, 5%	1,251, 4.3%	1,251, 4.3%	654, 2.2%	554, 1.9%	554, 1.9%

The results from Table 10 show that approximately 28% of the cumulative effects area currently provides canopy closure conditions that are considered optimal for roosting habitat and 8.8% of the cumulative effects area is optimal foraging habitat. Suitable habitat exists on approximately 61.6% of the cumulative effects area. Based on field observations and GIS data, the distribution of roosting and foraging habitat is widespread across the project area, however, changes in habitat are most apparent in MA 3.0 where the majority (>90%) of proposed and reasonably foreseeable future treatments will occur.

Optimal roosting habitat for the Indiana bat decreases from the current 28% for all three alternatives. Most notably, the greatest reduction in optimal habitat occurs in Alternative 1 with a drop to 17.2% in 2017 while the Alternative 2 is reduced to 20% and Alternative 3 is reduced to 19%. By 2026 all three alternatives have dropped to around 8% as the overstory is removed or, in the case of Alternative 1 as stands continue to grow and no longer retain the 60-80% canopy closure. Optimal foraging habitat experiences a parallel decline from 8.8% currently, to about 2% across all alternatives by 2026.

Changes in less than suitable habitat after the first entry (2017) include an increase of about 2.5% of seedling and sapling habitat from the current 0%. By 2026 Alternative 1 remains at about 2.4% seedling and sapling habitat and Alternatives 2 and 3 increase to 8.6 and 7.4% respectively. The amount of openings does not change across alternatives because we do not anticipate changes to wildlife openings or shrubland (from GIS data). However, in order to take into account the additional 3.9% of the habitat that will be impacted through predicted oil and gas development (Table 7) it is necessary to add this percentage to the totals for less than suitable habitat. In fact, habitat which will be impacted by this development is anticipated to convert suitable habitat to less than suitable or unsuitable habitat. Recall that Romme et al. (1995) found that Indiana bats will forage over clearings with early structural vegetation, along the forested border of agricultural fields, and along strips of trees extending into more open habitats. This 3.9% change will create some edge habitat which may be used by bats for foraging, but the majority of the land will be converted to non-vegetated openings and passages that decrease available roosting habitat. Cumulatively, this amounts to an increase in less than suitable habitat to 9% under Alternative 1, 15.2% under Alternative 2, and 14% under Alternative 3 by 2031. Because we cannot predict the exact locations of new development, it is difficult to say how this will impact optimal roosting and foraging habitat which is limited to very specific areas within the cumulative effects boundary. It is probable however, that there will be a reduction in suitable roosting and foraging habitat from the projected amounts in 2026 (equal to 2031) to 77.1, 71.1, and 72.1% across Alternatives 1, 2 and 3 respectively. At these new estimated percentages, the amount of available suitable habitat will still increase from the current 61.6% by 11 to 17%

across all three alternatives with the greatest amount available under Alternative 1, followed by Alternative 3 and then 2.

Based on field observations, snags which provide potential roosts appear to be well distributed across the analysis area. Forest Service proposals and reasonably foreseeable future vegetation management may reduce the total number of standing snags, however, it is Forest Service standard to retain at least 9 snags with sloughing bark greater than 10 inches DBH per harvest acre (Forest Plan, p. 82) and guideline to retain trees with characteristics of suitable roosts whenever possible while removing hazard trees between October 15 and April 1 (during bat hibernation) whenever possible (Forest Plan, p. 82). The Forest Service recommends these mitigations also be followed by private OGD developers working on public lands.

Overall, optimal roosting habitat for the Indiana bat across the cumulative effects area is reduced from 28% to about 8% and optimal foraging habitat is reduced from 8.8% to about 2% across all three alternatives. However, suitable roosting and foraging habitat will increase from the current 61.6% to 77.1% under Alternative 1, 71.1% under Alternative 2, and 72.1% under Alternative 3. Less than suitable habitat (openings, seedling and sapling, and private development) increases across all three alternatives to 9, 15.2, and 14% for alternatives 1, 2, and 3 respectively.

Indiana Bat Determination of Effects and Rationale

Alternative 1

A **‘no effect’** determination is made for the Indiana bat under Alternative 1 because there are no Federal activities proposed under this alternative. Although impacts from reasonably foreseeable future vegetation activities and oil and gas development will continue to happen, the effects of this project will not contribute cumulatively under this alternative.

Alternatives 2 and 3

A **‘may affect, not likely to adversely affect’** determination is made for the Indiana bat for both alternatives based on the analysis of direct, indirect, and cumulative effects. The project will not modify or destroy critical habitat or jeopardize the continued existence of the species. This conclusion is based on the following rationale:

1. Across the cumulative effects area, optimal roosting habitat is reduced from 28% to about 8% and optimal foraging habitat is reduced from 8.8% to about 2% across both alternatives. Less than suitable habitat (openings, seedling and sapling, and private development) increases across both alternatives to 15.2 and 14% for Alternatives 2, and 3 respectively. However, suitable roosting and foraging habitat will increase from the current 61.6% to 71.1% under Alternative 2, and 72.1% under Alternative 3. This means that suitable roosting and foraging habitat will continue to predominate across the landscape as a result of implementation of either of these alternatives.
2. The majority of the forested landscape within the project area and across the ANF will continue to provide suitable to optimal roosting (including maternity roosting) and

foraging habitat for the Indiana bat. In addition, due to natural causes such as mature growth or insects and disease, there will continue to be a production of standing-dead trees which have the cavities, crevices or exfoliating bark necessary to support roosting bats.

3. Finally, Forest-wide surveys have shown that Indiana bat use of the ANF has been very rare and no female or maternity roosts have been identified. Indiana bat abundance and habitat use on the ANF can be characterized as “limited to occasional summer visits by solitary males”. The likelihood of an Indiana bat being directly harmed by or exposed to any of the activities undertaken in this project are therefore considered very low. In addition, potential harm or harassment to the Indiana bat is reduced with the implementation of Forest Plan standards and guidelines described above (USDA-FS 2007a, pp. 116-118).

Small Whorled Pogonia (*Isotria medeoloides*)

The life history, population trends, threats, and habitat status and information gaps for the small whorled pogonia (SWP) are located in the Forest BE (pp. 125-130). In summary, between 1986 and 2004, potential habitat covering 350,000 acres was surveyed and no SWP were found. This rare orchid typically occurs as only a few plants at any particular location and not all individuals will flower in any given year making observations of this species rare. In Pennsylvania, the largest site where this orchid occurs is located 55 miles east of the ANF on State Game Lands near Centre County where a population was found in 1987 and 1991. No plants were found in 2003 or 2004. Another site occurs 15 miles west of the ANF in Venango County but as of 2005 the status of this site remains undetermined.

Project Area Habitat Analysis

In 1994 following discussions with the US-FWS and P. Wiegman of the Western Pennsylvania Conservancy, the ANF defined suitable habitat for the species as mature or maturing forest conditions (30-80 years), topographic saddles and swales between benches and/or ephemeral streams, and sites with little or no understory and without dense fern. In particular, SWP like sites with mature or maturing oak species. In 2001 the ANF funded a project with the Western Pennsylvania Conservancy to revise its field reconnaissance methodology and to refine habitat requirements on the ANF. The study suggested a weighting scheme be applied with the highest values given to areas with a slope of 11-17%, soils containing a fragipan, and forest cover dominated by oak. The ANF then developed a GIS model based on these attributes.

The GIS model indicates that approximately 6% (1,251 acres) of the project area and 6.6% (1,928 acres) of the cumulative effects area has high potential habitat distributed relatively equally across MAs 2.2 (533 acres) and 3.0 (747 acres) within the cumulative effects area. An additional 8% (648 acres) is located on private land (26% of the cumulative effects area).

Small whorled pogonia (SWP) surveys were conducted in all stands proposed for soil-disturbing treatments that contained high potential habitat as described by the SWP model. In total, 1,108 acres were surveyed for SWP during the 2009 and 2010 field seasons. No SWP were found during these surveys.

Direct and Indirect Effects of the Proposed Activities on the Small Whorled Pogonia

Stand-level Effects

Site-specific direct effects to individual plants are difficult to predict since there are no known occurrence within the direct effects boundary. These activities include any kind of timber harvest (including pit expansion, new road construction, and stream habitat improvements).

Alternative 1 is expected to have no direct or indirect effects because there are no activities proposed. Under Alternatives 2 and 3 there are no seasonal restrictions for SWP, however, it is a Forest Service standard to halt any activities that may cause impact within 300 feet of the area of influence surrounding discovered plants or populations while consultation with US-FWS occurs (USDA-FS 2007a, p. 84). The effects to SWP through NNIP treatments are minimized with the appropriate mitigation measures and any negative effects will be outweighed by the benefits. there is a long-term beneficial effect from reducing competing species and increasing available suitable habitat.

Other treatments which could have direct and indirect effects to SWP include any treatments that result in the conversion of forest to non-forest or timber harvest treatments that maintain forest vegetation but significantly alter site conditions. Regeneration harvest treatments on 1,335 acres under Alternative 2 and 1,056 acres under Alternative 3 can result in a significant change in site conditions due to changes in light, temperature and moisture conditions. Direct effects could occur when harvests are implemented during the growing season, particularly in the summer months. In general, silvicultural treatments are implemented under winter frozen conditions to protect soil conditions; therefore, direct impact to SWP is reduced significantly. In addition, the risk of impact to SWP plants or populations is considered extremely low, due to the field data collected over the last two decades described above.

New roads and road reconstruction do not provide suitable SWP habitat, however, temporary haul routes and old road corridors that establish a break in the forest canopy allowing additional sunlight to reach the forest floor along the edges of these corridors could provide suitable growing conditions. According to Mehrhoff (1989), sparse to moderate ground cover is a characteristic of SWP sites which may make a proximity to logging roads, streams or other features that create long, persistent breaks in the forest canopy suitable habitat for this species.

Proposed prescribed burning for both Alternatives 2 and 3 are anticipated to occur in the spring of the 2013 (135 acres) and 2016 (113 acres). The exact time of burn will vary somewhat from year to year depending on site-specific weather and fuel conditions. It is possible to burn in the summer months of June, July, or August, when SWP is blooming, however, it is not likely that this will occur on the ANF due to the fuel types, canopy moisture and desired management objectives (Craig Kostrzewski, pers. comm. March 14, 2011). Although this could result in take of SWP, the likelihood of this happening is remote.

Landscape-level Effects

The landscape level effect of overstory removal is that these areas will no longer provide desirable SWP site conditions. Regeneration harvests will temporarily create less suitable habitat on 1,335 acres under Alternative 2 and 1,056 acres under Alternative 3. Although forest

habitat is not permanently lost, suitable growing conditions may be unavailable for 40 to 50 years while regenerating trees mature.

Any treatments which promote oak regeneration (this includes prescribed fire for oak) would be considered beneficial to SWP from a landscape perspective since SWP prefer oak sites in Pennsylvania (Forest BE, p. 127).

Cumulative Effects of the Proposed Activities on the Small Whorled Pogonia

Stand-level Effects

As described under the stand level direct effects, the cumulative effects to SWP and its habitat are caused by the impacts of certain activities such as timber harvest, prescribed fire, NNIP treatments, and conversion of forested land to non-forested. In the case of cumulative effects, reasonably foreseeable future regeneration harvests on 72 acres (Table 4) in addition to the reasonably foreseeable future 790 acres of land that will be impacted by new private oil and gas development (Table 7) which would contribute to the activity from proposed treatments and which may potentially impact individual plants or populations of SWP compared with any of the three alternatives alone.

Landscape-level Effects

At the landscape level, the conversion of 790 acres, or 4% of the cumulative effects area for new private oil and gas development in addition to pit development on 21 acres (0.1% of the cumulative effects area) proposed under Alternatives 2 and 3, will convert potential SWP habitat to unsuitable habitat. In addition to this, reasonably foreseeable future final harvest, and regeneration harvests proposed in this project contribute another 7.1% (1,407 acres) under Alternative 2 and 5.7% (1,128 acres) under Alternative 3 of affected suitable habitat. The vegetation treatments in comparison to the private development which convert forested habitat to non-forested will have a shorter term impact due to the temporary nature of the changes in habitat characteristics.

Small Whorled Pogonia Determination of Effects and Rationale

Alternatives 1, 2 and 3

A ‘**no effect**’ determination is made for the small whorled pogonia for all three alternatives based on the analysis of direct, indirect, and cumulative effects. The project will not modify or destroy critical habitat or jeopardize the continued existence of the species. This conclusion is based on the following rationale:

- Within the project area, 1,108 acres were surveyed for SWP during the 2009 and 2010 field seasons. No SWP were found during these surveys. In addition, no SWP have been found within the proclamation boundary and the Forest BE provides guidelines for the protection of this species if any plants are found.
- Regeneration treatments within high potential SWP habitat exist on less than 5% of the project area.

Northeastern Bulrush (*Scirpus ancistrochaetus*)

The life history, population trends, threats, and habitat status related to the northeastern bulrush is located in the Forest BE (pp. 120-123). In summary, although there are no known occurrences of northeastern bulrush on the ANF, suitable habitat occurs as vernal pools or beaver influenced wetlands across the Forest. Ongoing County Natural Heritage Inventories and the Wetland Plant Survey conducted by the Western Pennsylvania Conservancy (WPC 1989b) have not located any populations to date. Northeastern bulrush tends to grow in acidic environments such as bogs and in open, tall herb-dominated wetlands where water levels fluctuate seasonally and/or annually.

Project Area Habitat Analysis

The U.S. Fish and Wildlife Service is the principal Federal agency that provides information to the public on the extent and status of the Nation's wetlands. The agency has developed a series of topical maps based on April 1977 aerial photograph interpretation to show wetlands and deepwater habitats. This geospatial information was used to identify wetlands within the Morrison Run effects areas. The National Wetlands Inventory (US-FWS) identifies twenty-six wetlands within the Morrison Run cumulative effects boundary. Freshwater forested/shrub wetland is found along Brothwell Run, Chappel Fork and North Fork Chappel Fork, Kinzua Creek, Crary Run, and Bucklick Run. Freshwater emergent wetland is located on Sugar Run, Morrison Run, Hemlock Run, Chappel Fork (southwestern and northeastern portion), and Kinzua Creek. An additional ten wetlands typed as *lake* which line the entire western border of the project area where the Allegheny Reservoir begins. In total, there are 200 acres of wetlands mapped for this area. It is important to note that NWI data is not comprehensive and does not represent all possible wetland habitat within the effects area. However, it is the best available data at this time.

Surveys of areas with proposed actions within the project area identified some small vernal pools in forested stands and seasonally flooded areas in the vicinity of streams; however, no northeastern bulrush was identified.

Direct and Indirect Effects of the Proposed Activities on the Northeastern Bullrush

Alternative 1 is expected to have no direct or indirect effects because there are no activities proposed. Adverse direct effects on a local population from Alternatives 2 and 3 are possible if timber harvesting or related ground disturbing activities occur within suitable habitat and if the species is present. In the direct effects area, the most suitable growing conditions for this species are found in the riparian zones along perennial streams. However, these treatments will implement Forest Plan standards and guidelines regarding the protection of wetlands, riparian zones, vernal pools, springs and seeps (USDA-FS 2007a, pp. 74-79). These actions will provide preferential treatment and establish buffers for wetlands, vernal pools, and riparian habitat and ensure there is no adverse effect on potentially suitable habitat of this species.

Proposed actions along streams include 4.1 miles of aquatic habitat treatments along Pigeon, Hemlock and Morrison Run and NNIP treatments along Brothwell, Morrison, Pigeon, and Indian Run, Wolf Run Marina, and Chappel Fork and North Fork Chappel Fork. The aquatic habitat treatments propose to fell approximately 25 trees per mile (225 trees) into streams and onto floodplains. Trees will be cut within the riparian area, but at least 10 feet from the edge of the

stream bank. These activities have the potential to directly impact individual plants or populations, but also could have a positive indirect effect of creating the more “open” habitat which this species prefers. Similarly, NNIP treatments have the potential to improve site conditions for the northeastern bulrush by reducing competitive species. NNIP removal includes manual/mechanical and/or herbicide treatment. The treatment type depends on the species, area of infestation, and site conditions. If herbicide is needed to control invasive plants, it will be done following the Forest Service standard of surveying for the presence of species with viability concerns prior to treating an area (USDA- 2007a, p. 55) and pesticide application standards and guidelines will be followed including what type of herbicide to use and buffers (USDA-2007a, pp. 54-59). In addition, herbicide along streams is accomplished by targeting species and avoiding non-target species either through the application method or through the timing of application (April Moore, pers. comm. March 22, 2011). Initial surveys identified <10 acres of infestation of various species including multiflora rose, barberry, bull thistle, and honeysuckle.

Cumulative Effects of the Proposed Activities on the Northeastern Bullrush

Reasonably foreseeable future activities are anticipated to have the same effects as those described under the direct and indirect effects analysis. Reasonably foreseeable oil and gas development is not required to follow Forest Service standards and guidelines for wetland buffers and mitigation. However, all oil and gas developments operate under state regulations including a permit process through the Department of Environmental Protection which protects wetland areas and federal regulations including the Endangered Species Act. The Forest BA states that known occurrences of federally-listed, proposed, threatened, or endangered species that are located in the vicinity of a proposed mineral development, will be documented in a letter to the operator and copied to the US-FWS Field Office in State College, Pennsylvania. This letter will direct the operator to contact the USFWS to resolve issues related to threatened and endangered species prior to proceeding with any tree cutting or earth disturbance (pp. 124-125). In addition, the ANF conducts biological surveys on proposed lease development that impact federal land. Unique plant communities are identified as well as wetlands, vernal pools and riparian zones. Project design features safeguarding these resources are developed and modifications to the lease proposal are negotiated with owners and implemented on the ground.

Northeastern Bullrush Determination of Effects and Rationale

Alternatives 1, 2 and 3

A ‘no effect’ determination is made for the northeastern bulrush for all three alternatives based on the analysis of direct, indirect, and cumulative effects. The project will not modify or destroy critical habitat or jeopardize the continued existence of the species. This conclusion is based on the following rationale:

- There are no known occurrences of the northeastern bulrush either in the effects area or within the Forest proclamation boundary.
- The riparian-associated treatments proposed in Alternatives 2 and 3 are site-specific, very limited in scope, and expected to maintain or enhance aquatic and streamside habitats. Although Alternative 1 will not have the beneficial impacts of these proposed activities, there is no anticipated direct effects to this species.

- Under all three alternatives, the implementation of Forest-wide standards and guidelines regarding the protection of wetlands, vernal pools, and riparian areas will be implemented.

SPECIES NOT DOCUMENTED AND NO SUITABLE HABITAT IS FOUND WITHIN THE EFFECTS BOUNDARIES

Clubshell mussel (*Pleurobema clava*), Northern riffleshell mussel (*Epioblasma torulosa rangiana*), Rayed-bean (*Villosa fabalis*), Sheepnose (*Plethobasis cyphus*), and Rabbitsfoot (*Quadrula cylindrical*)

These species do not have suitable habitat and individuals have not been documented within the Morrison Run effects boundaries. Therefore, a “**No Effect**” determination is made for all five mussel species. No further discussion of these species will occur.

III. SUMMARY OF DETERMINATIONS FOR THE MORRISON RUN PROJECT

Based on the above analysis, Table 11 displays the determinations reached for the species analyzed in this BA.

Table 11. Determinations for Federally Endangered and Threatened Species

Species	Alternative 1	Alternative 2
Indiana bat	‘No Effect’	‘May affect, not likely to adversely affect’
Small whorled pogonia; Northeastern bulrush	‘No Effect’	‘No Effect’
Clubshell mussel; Northern riffleshell mussel; Rayed-bean; Sheepnose; Rabbitsfoot	‘No Effect’	‘No Effect’

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V. PROJECT AREA AND VICINITY MAPS

Biological Assessment for the Morrison Run Project

